igneous rocks. It summarises the characters of the chief rock-forming minerals, and of the origin and classification of rocks, and is illustrated by an admirable series of photographs and diagrams showing the field relations of igneous rocks. The author makes a useful protest against the appropriation by geologists of popular rock names in new and technical meanings. The term granite, for example, is used in the stone trade in its correct historical and etymological sense, which is entirely different from its use in geology. This system is as inconvenient, as Prof. Pirsson points out, as if botanists had re-defined the terms bush, tree, and shrub, limiting each to a particular species. Prof. Pirsson's protest is justified, and though some American geologists are using the familiar terms in their popular meanings, this reform has probably been proposed too late.

(2) Mr. Brenton Symons's "Genesis of Metallic Ores and the Rocks which Enclose Them" is also intended to appeal to the general elementary student, and is an attempt to explain the formation of ore deposits free from unnecessary technicalities. It is a book, however, of very different standard from Prof. Pirsson's; it is written by a practical engineer, who is keenly interested in the theoretical study of mining geology, but whose knowledge of the subject is a little unequal.

The book begins with a general introduction on geological principles, followed by a section on rock metamorphism; the third part of the book deals with the ore deposits. Though the author avoids so far as possible technical scientific terms, his text is often repellent by the abundant use of such Americanisms as cavations for spaces, such reformed spellings as "lentiles" for "lenticles," and vegetal for vegetable, and mining terms of only local value. The most valuable part of the book is its collection of diagrams of ore occurrences; the instances drawn from Cornwall are the most satisfactory, for some of his diagrams and views regarding ores in other parts of the world are a little out of date. Mr. Symons takes, moreover, an extreme position as to the genesis of ores. He has a great belief in the agency of geosynclinals, by which sediments are carried down to depths where they are melted, and then forced to re-ascend as igneous rocks into overlying strata; and though he describes many ores as plutonic, he appears to regard the vast majority of ores as having been derived from the destruction of Archæan rocks and precipitated in the sea. He says, on p. 381, "It has been already observed that nearly all the ores that can come within the reach of man have been derived from the Archean strata"; from these rocks, according to Mr. Symons, the metals are removed in solution and "precipitated on the bottom of the sea by chemical reactions that were principally set up by organic matter." He has no doubt, for example, that the gold in the reefs of Nova Scotia and the copper ores of Mansfeld were deposited in the rocks of those mining fields during their deposition in the sea. His view of the origin of crystalline rocks of most ores is shown by the following quotation.

"The presence of such minute proportions in all formations is natural, since the crystalline rocks, as far as known, were originally deposited as marine strata, and, consequently, retain some part of the minerals that were precipitated during sedimentation from the oceanic waters. The proportion of these metals appears to be just the same, whether districts are metalliferous or not" (p. 363).

This extract shows that the author adopts such an extreme position in regard to the genesis of ores that his book must be read with caution.

ZOOLOGICAL PRIMERS.

(1) *Die Säugetiere Deutschlands.* By Dr. C. Hennings. Pp. 174. (Leipzig: Quelle und Meyer, 1909.) Price 1.25 marks.

(2) *Korallen und andere gesteinsbildende Tiere.* By Dr. Walther May. Pp. iii+122. (Leipzig: B. G. Teubner, 1909.) Price 1.25 marks.

(3) *Die Fortpflanzung der Tiere.* By Dr. R. Goldschmidt. Pp. iv+124. (Leipzig: B. G. Teubner, 1909.) Price 1.25 marks.

(4) *Die Stammesgeschichte unserer Haustiere.* By Prof. Dr. T. Keller. Pp. iii+114. (Leipzig: B. G. Teubner, 1909.) Price 1.25 marks.

(5) *Biology.* By Prof. R. J. Harvey Gibson. Pp. viii+120. (London: J. M. Dent and Co., 1909.) Price 1*s.* net.

(1) THE most useful portion of this sketch of the mammalia of Germany lies in the synoptic tables placed at the head of each order; but these can hardly be considered as complete, since they do not include any account of the subspecies, which are of the greatest interest.

A complete list prefixed to this book would have made comparisons with the fauna of other countries a much easier matter. As it is, one has to search through the index in order to discover what forms are included in this work.

(2) Dr. May is a well-known writer on the anatomy of corals, and in this little work he brings together descriptions of a heterogeneous assemblage of animals, the common feature amongst which is the property of producing a hard exoskeleton, or of contributing otherwise by their remains to the formation of strata.

The question inevitably arising out of this treatment is, What determines the difference between, say, a soft anemone and an encrusted coral? To this Dr. May has, so far as we can see, no answer. Nevertheless, his book contains a good sketch of the various hypotheses accounting for the origin and formation of coral-reefs, and for this, if for nothing else, it is welcome. The corals and lamellibranchs appear to us the best parts of the work.

(3) Dr. Goldschmidt has undertaken to compress into a hundred small pages an account of the methods of animal reproduction, with especial reference to the number of the young, their state on hatching, their habits and adaptations. The work cannot be considered as really up to date, but the treatment is interesting, and the subject is one of such importance that we regret more space could not have been allotted to it. The illustrations are better than those of any other booklet of this series we have so far seen.

(4) In an earlier and larger work, published some

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three years ago, Dr. Keller advanced his views on the origin of domesticated animals. The present little work is an abstract of the larger one, and gives only the most meagre outline of the evidence on this difficult subject. The time has not yet arrived when such a work can be successfully written. We know far too little to establish conclusions on the origin of most of our familiar animals, and we can only recommend this work on a most interesting subject with considerable reserve. Prof. Ewart's work on horses appears to be unknown to the author. The book has no index.

(5) The general scheme of this primer is excellently devised. Beginning with a sketch of function, the author passes on to differentiation. The values, transformations, and elaboration of food-stuffs are next dealt with, and a special section is given to "sensitivity." The adaptations of organisms are briefly considered, and a short account of reproduction is given. The primer concludes with a sketch of the theory of natural selection. Such a concise statement of the general principles of animal and plant life should be of considerable use to teachers of elementary science.

The value of the book would have been increased by better illustrations. Many of those employed (for example, Nos. 8, 9, 18, 19, 37, 40, and 47) are so incompletely described as to lose much of their value. The figure of Padina (Fig. 2) is extremely vague. The text as a whole is what we should expect from such an experienced teacher as Prof. Harvey Gibson, and it has had the benefit of revision from his colleagues. The account of the destruction of life as illustrated by a dinner (p. 114) is perhaps open to criticism. The benefits of cultivation in increasing the number and variety of edible organisms are not pointed out. Moreover, in contrast to wild species, the individuals of cultivated ones have surely not remained "fairly constant" in numbers. Demand has in this case created supply. So far from illustrating natural selection, such an example seems to typify artificial selection. The statement about green Hydra on p. 43 goes beyond our present knowledge.

SOME NEW ELECTRICAL BOOKS.

(1) *The Bell Telephone.* The Deposition of A. G. Bell in the Suit brought by the United States to annul the Bell Patents. Pp. iv+469. (Boston: The American Bell Telephone Co., 1908.)

(2) *How Telegraphs and Telephones Work.* Explained in non-technical language by C. R. Gibson. Pp. vi+156. (London: Seeley and Co., Ltd., 1909.) Price 1*s*. 6*d*. net.

(3) *Technical Electricity.* By H. T. Davidge and R. W. Hutchinson. Second edition. Pp. xi+539. (Cambridge: University Tutorial Press, Ltd., 1909.) Price 4*s*. 6*d*.

(1) THE printing of the full deposition made by Mr. Bell in the suit brought by the United States to annul the Bell telephone patents doubtless furnishes a valuable historical record of the experiments which led to the invention of the telephone, and, since the deposition was never officially printed, the American Bell Telephone Co. has performed a useful service in the publication of this book. To any who may still be interested in the legal aspects of the case the book should also prove valuable. But for the general reader, even when specially interested in telephony, the verbatim report of a legal examination and cross-examination is a very unsatisfactory medium for conveying information. The constant repetitions, the frequent insistence on what must be regarded from the broader point of view as wholly irrelevant details, and, above all, the clumsiness of a dialogue devoid of literary merit, make very poor reading, and one is liable to be overcome with ennui before any salient points have been gleaned.

By judicious, if comprehensive, skipping, however, many facts of both scientific and general interest may be obtained from this volume, and to many the detailed descriptions of the earlier struggles and difficulties leading to an invention of enormous utility and importance will have a particular fascination. It is only to be regretted that the book was not written in consecutive narrative form, though possibly some of its value as a record might have been sacrificed thereby.

(2) That Mr. Gibson has an aptitude for the description in non-technical language of the achievements of modern technology has been amply proved by his earlier books which have been reviewed in these columns. The present small volume shares the merits of its predecessors. The very large degree to which the telegraph and telephone enter into the daily life of the community should make this book particularly useful, and it should find a large circle of readers. The book is more or less an amplification of the chapters dealing with this branch in earlier more general books. The subjects covered are telegraphy and telephony, both with wires and without; there is a short chapter on lightning, the reason for the inclusion of which "by request" does not seem clear, and three concluding chapters of a more general character on electrical units and theory. The volume is well printed and illustrated.

(3) This text-book was originally published in 1906, and the present is the third impression. Advantage has been taken of the new edition to bring some parts of the book more up to date, but the revision has not been very thorough, as reference to the chapter on lamps (in which there has been very marked progress since 1906) will show. The tungsten lamp is allotted seven lines of small print, but the osmium lamp, almost if not quite defunct, remains in possession of what we presume was its original position in the main text. The whole chapter on lamps seems to us poor; the drawing of an arc in Fig. 128 is purely imaginary, and the authors would do well to refer to Mrs. Ayrton's book before they issue their next edition; the section on flame arcs and the reference to the Bremer arc lamp lead us to the conclusion that the authors have no correct idea of the real difference between the flame and the ordinary arc.

It is perhaps somewhat unkind to take exception to such errors in what is only one chapter amongst four-and-twenty. But it is deplorable that a text-

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